Pearson BTEC Level 3 Nationals Extended Certificate

Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | Learner Registration Number

Time Supervised hours: 3 hours

Paper reference **21327L**

Applied Human Biology

UNIT 3: Human Biology and Health Issues

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and learner registration number.
- Answer **all** activities.
- Answer the activities in the spaces provided – *there may be more space than you need.*
- This booklet contains materials for the completion of the set task under supervised conditions.
- This booklet is specific to each series and this material must be issued only to learners who have been entered to undertake the set task in the relevant series.
- This booklet should be kept securely until the start of the 3 hour supervised assessment period.
- This set task should be undertaken in a session timetabled by Pearson.

Information

- The total mark for this paper is 60.
- The marks for **each** activity are shown in brackets – *use this as a guide as to how much time to spend on each activity.*

Advice

- Read each activity carefully before you start to answer it.
- Try to answer every activity.
- Check your answers if you have time at the end.

Turn over ▶

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Pearson

Instructions for teachers/tutors and/or invigilators

Centres must issue this booklet at the appropriate time and advise learners of the timetabled session.

All learner work must be completed independently and authenticated before being submitted to Pearson by the teacher/tutor or invigilator.

Learners are advised to spend 30–45 minutes reading through the stimulus material in the set task and annotate the material if they wish to do so.

Learners are required to use the stimulus material to complete the activities.

Learners must complete the set task using this task and answer booklet.

Teachers/tutors and/or invigilators should note that:

- learners must not be given any direct guidance or prepared materials
- all work must be completed independently by the learner
- learners must not bring anything into the supervised environment or take anything out without your approval.

Centres are responsible for putting in place appropriate checks to ensure that only permitted material is introduced into the supervised environment.

Maintaining security

- During supervised assessment sessions, the assessment areas must only be accessible to the individual learners and to named members of staff.
- Learners can only access their work under supervision.
- Any work that learners produce under supervision must be kept securely.
- Only permitted materials for the set task can be brought into the supervised environment.
- During any permitted break, and at the end of the session, materials must be kept securely and no items removed from the supervised environment.
- Learners are not permitted to have access to the internet or other resources during the supervised assessment period.

After the session, the teacher/tutor or invigilator will confirm that all learner work has been completed independently as part of the authentication submitted to Pearson.

The set task is a formal external assessment and must be conducted with reference to the instructions in this task and answer booklet and to the *BTEC Nationals Instructions for Conducting External Assessments (ICEA)* document.

Outcomes for submission

This task and answer booklet should be submitted to Pearson.

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Instructions for learners

Read the set task information carefully.

You are advised to spend 30–45 minutes reading the article in the set task.

You may add notes to the article before you start the activities.

Complete all your work in this task and answer booklet in the spaces provided.

This session is three hours. Your teacher/tutor or invigilator will tell you if there is a supervised break. Plan your time carefully.

In your response to the activities, you should consider information from the article and use your knowledge and understanding of applied human biology principles, procedures and techniques to support your answers.

You will complete this set task under supervision and your work will be kept securely during any breaks taken.

You must work independently throughout the supervised assessment period and you must not share your work with other learners.

You may ask your teacher/tutor or invigilator to explain any words or sentences you do not understand in the article or the activities. Your teacher/tutor or invigilator cannot help you complete the set task.

Outcomes for submission

This task and answer booklet should be submitted to Pearson.

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Set task information

You are given the following article:

Could Nutritional Science be the answer to preventing the cardiovascular disease crisis?

You need to read the article so that you get an understanding of the health issue involved.

You should be able to interpret, analyse and evaluate the article.

At the end of the article, there is a glossary giving the meanings of some of the words in bold used in the article.

Could Nutritional Science be the answer to preventing the cardiovascular disease crisis?

Cardiovascular disease (CVD) is a term for conditions affecting the heart or blood vessels. CVD is usually associated with **atherosclerosis** and an increased risk of **blood clots** in vessels, such as coronary arteries and arteries in the brain, which may cause heart attacks and strokes. CVD can also cause damage to arteries in organs including the kidneys and eyes[1]. CVD is one of the main causes of death and disability in the world[2], as shown in Figure 1.

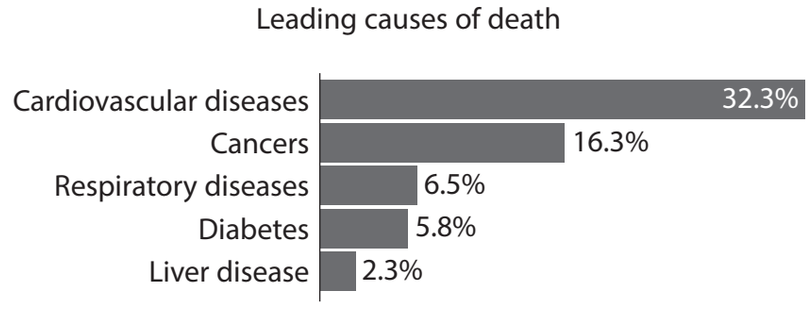

Figure 1*

*Figure 1 does not add up to 100% because only certain causes of death have been included.

CVD can be treated, and sometimes prevented, by people having a healthy lifestyle and eating a **balanced diet**.

As a result of developments in **agriculture** and food manufacturing in the 20th century, the average person's diet changed dramatically. Supermarkets provided quick and easy meals, snack foods and sweets. Home-cooked meals were replaced with fast food. Noticing a rise in various diet-related illnesses, including CVD, scientists in many countries across the world began investigating the potential causes for this increase, creating an entirely new field called **Nutritional Science**.

In 1983, the UK Government produced dietary guidelines to try to reduce the incidence of CVD. The UK's National Advisory Committee on Nutritional Education advised people to eat less **saturated fat** and **cholesterol**[3]. Consumers and the food industry quickly responded to this advice. The food industry started to produce alternatives to common items, such as skimmed milk and fat-free yoghurt, which were low in fat but high in sugar. However, the guidelines did not have the desired effect; the next 30 years saw a huge rise in incidence of CVD and in the number of prescriptions from doctors for medicine used in the prevention and treatment of CVD[4], as shown in Figure 2.

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Prescriptions used in the prevention and treatment of CVD, 1981 to 2008, England

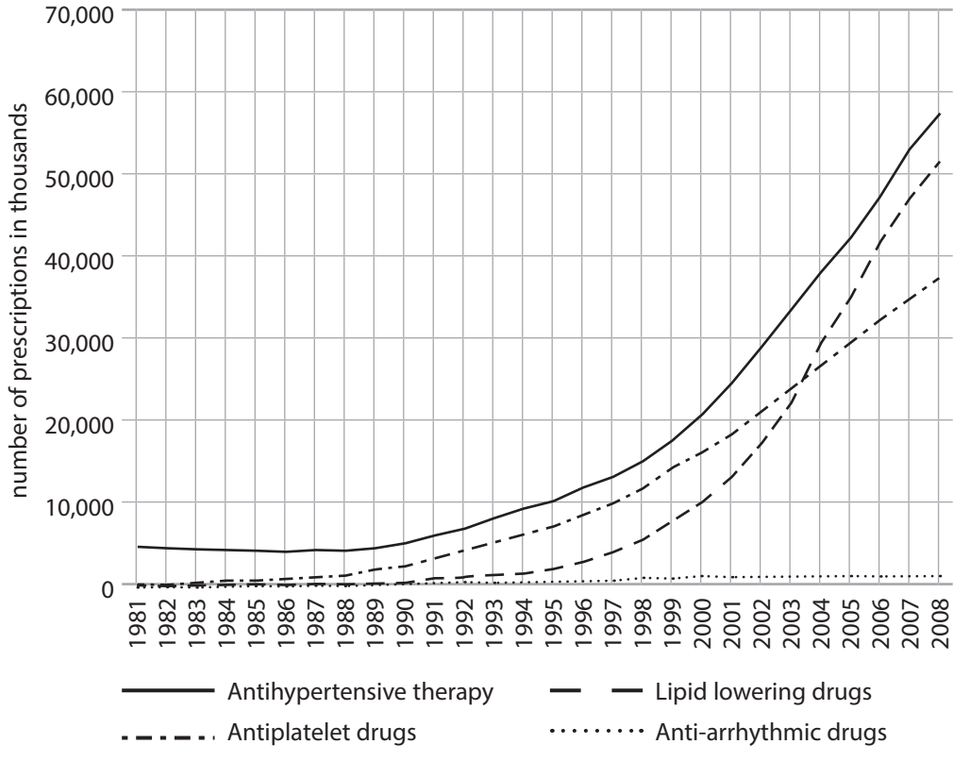
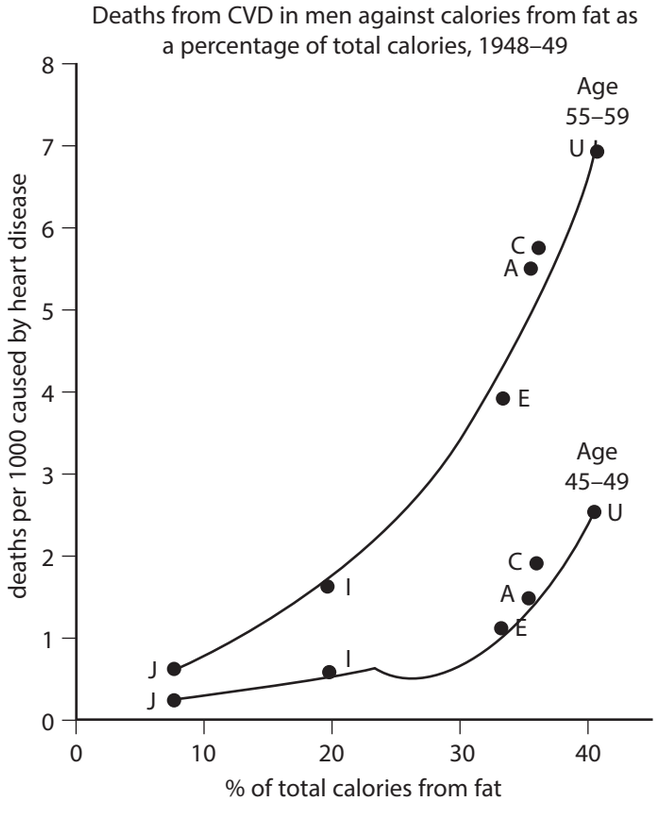


Figure 2

Evidence that fat increases the risk of CVD

The evidence used to support the UK Government's guidelines originated from the work of an American scientist named Dr Ancel Keys. His project, The Seven Countries Study (SCS) in 1958, was the first major study to investigate diet and lifestyle along with other risk factors for CVD. The study spanned seven contrasting countries and cultures over an extended period of time. The SCS involved 11,579 males, between the ages of 40–59 years, across four regions of the world (United States, Northern Europe, Southern Europe and East Asia)[5].

Each point on the graph in Figure 3 represents a group of men from a particular country for two different age groups. Dr Keys used this information to show that Americans consumed the highest levels of saturated fats and also had the highest number of deaths from CVD. However, in Japan, where the subjects of the study consumed lower levels of saturated fats, there were significantly fewer deaths from CVD[6]. After years of collecting and studying data from around the world, Dr Keys concluded that saturated fat caused CVD.



Letter	Country
A	Australia
C	Canada
E	England and Wales
I	Italy
J	Japan
U	USA

Figure 3

Criticisms of the Seven Countries Study

The SCS and Dr Keys have been criticised for intentionally leaving out countries that did not fit his conclusion. People from Holland and Norway, for example, consumed high levels of fat in their diet but there were very few people with CVD. On the other hand, people from Chile consumed low levels of fat but there were still lots of people with CVD. It appeared that Dr Keys had only used data from the countries that supported his theory, a process known as **cherry picking**. Though Dr Keys had not included some information, the study gained media attention and had a major influence on dietary guidelines for the next 30 or more years.

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Evidence that sugar increases the risk of CVD

At the same time that Dr Keys was warning people about the dangers of saturated fats, a British scientist named Dr John Yudkin (the founder of the Department of Nutrition at the University of London), was investigating the effect of sugar on health. Dr Yudkin's data suggested a link between sugar consumption and CVD[7], as shown in Figure 4. This data was based on 100,000 men aged 55–64 who died of CVD in 1952.

Deaths from CVD in men aged 55–64 against sugar consumption, 1952

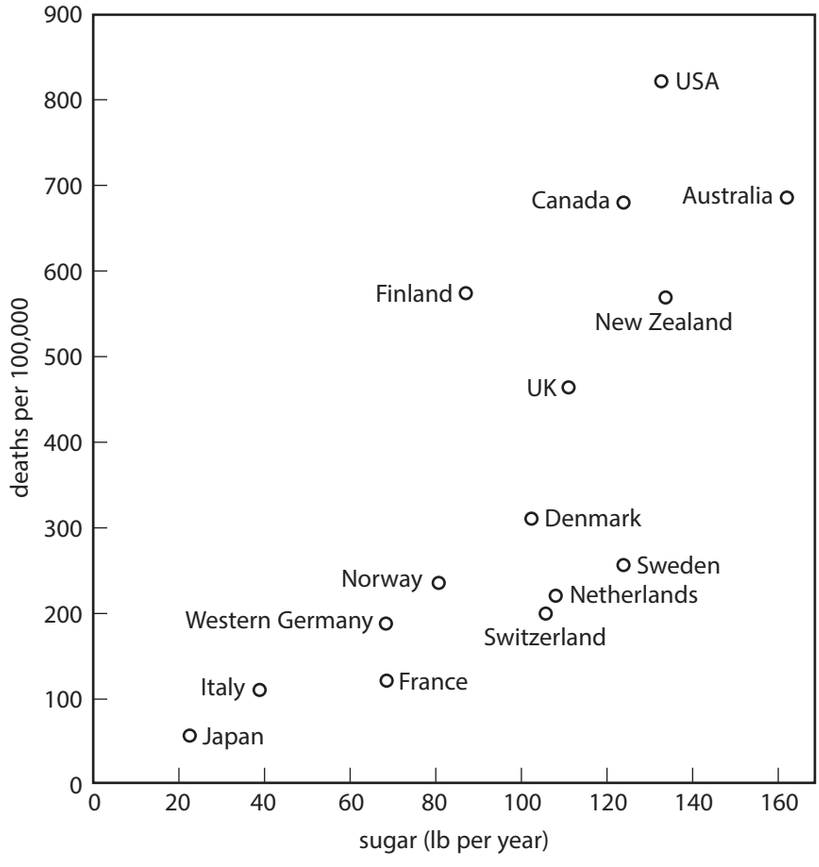

Figure 4

Experiments conducted by Dr Yudkin on both animals and students showed an increase in the level of **triglycerides** in the blood of those who consumed high levels of sugar in their diet. In 2016, an article in the Lancet[8] confirmed the link between high levels of sugar in the diet and the increased risk of developing CVD.

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Should we blame sugar or fat for CVD?

Nutritional Science has unfortunately gained a reputation for giving conflicting dietary advice. What can be bad for you one day can seem to be good for you the next. The involvement of wealthy sugar companies who fund research that identifies fat consumption as the major cause of CVD, and ensure their supporters are part of major government nutrition boards, has helped maintain the public perception of fat as a bad thing. An example of this is the British Nutrition Foundation (BNF), a charity that consults with many branches of the UK Government and educational bodies on nutritional matters. BNF is funded by Tate & Lyle and British Sugar, the two main sugar companies in the UK. BNF's staff also include many members who have worked for major sugar-related food companies.

The dieting industry, where many products simply replace the fat content with sugar, is worth more than £112 billion in Western Europe alone and has profited greatly from blaming fat for CVD.

The British Heart Foundation advises that even if you are a healthy weight you should still 'keep an eye on how much sugar you're eating'. In the UK, dietary surveys show most people eat too much sugar. As sugar is contained in many of the foods we eat, people can eat too much sugar without realising. Most foods contain several different types of sugar. Foods such as fruit, vegetables and milk contain sugar within their structure, but as these foods contain a lot of useful nutrients, you don't need to cut down on them. Most people need to cut down on free refined sugars. These are the sugars found in your food that aren't contained within the structure of the food[9].

To avoid unhealthy weight gain, the World Health Organisation issued the following advice in 2019[10]:

- total fat should not exceed 30% of total energy intake
- intake of saturated fats should be less than 10% of total energy intake
- intake of **trans-fats** should be less than 1% of total energy intake
- limiting intake of free sugars to less than 10% of total energy intake is part of a healthy diet
- a further reduction of the intake of free sugars to less than 5% of total energy intake is suggested for additional health benefits.

CVD is a complex disease that can be caused by many different factors, so people should consider all the possible causes when developing a strategy to prevent and treat CVD. Reducing fat in our diets has not stopped the increase in incidences of CVD over the last few decades, however the answer may still lie in Nutritional Science. The evidence against sugar is slowly being recognised and governments are starting to take action, such as the UK Government's 'sugar tax', introduced in 2018. But we are far from fully understanding the role the food we eat plays in the development of atherosclerosis and, as long as we continue to ignore the potential hazards in our diet, CVD will continue to be a major cause of death across the world.

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Glossary

Agriculture – the science or practice of farming, including clearing forests and cultivation of the soil for the growing of crops and the rearing of animals to provide food.

Atherosclerosis – a build-up of fatty deposits in the artery wall.

Balanced diet – a diet consisting of a variety of different types of food and providing the correct amounts of nutrients and energy necessary for good health.

Blood clots – a gelatinous mass of fibrin and blood cells formed by the coagulation of blood.

Cherry picking – the action or practice of choosing and taking only the most beneficial data from what is available.

Cholesterol – a compound synthesised in the liver from dietary saturated fat, needed for normal membrane function and found in most body tissues. A high level of low density lipoprotein (LDL) cholesterol in the blood is associated with an increased risk of CVD.

Nutritional Science – the study of behaviours and social factors related to food choices.

Saturated fat – a type of fat containing a high proportion of fatty acid molecules without double bonds, considered to be less healthy in the diet than unsaturated fat.

Trans-fats – a form of unsaturated fat found in fried and processed foods, that raise levels of LDLs.

Triglycerides – a molecule formed from one molecule of glycerol and three fatty acid groups. Triglycerides are the main components of natural fats and oils.

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References

1. 'Cardiovascular disease', London, UK, NHS [internet], 17/09/2018; Available from https://www.nhs.uk/conditions/cardiovascular-disease/

2. Ritchie, H., 'What do the people of the world die from?', London, UK, BBC Health [internet], 06/03/2019; Available from https://www.bbc.co.uk/news/health-47371078

3 Leslie, I., 'The sugar conspiracy', London, UK, The Guardian [internet], 07/04/2016; Available from https://www.theguardian.com/society/2016/apr/07/the-sugar-conspiracy-robert-lustig-john-yudkin

4 Scarborough, P. et al., 'Trends in Coronary Heart Disease, 1961–2011', British Heart Foundation Health Promotion Research Group, February 2011; Available from https://www.bhf.org.uk/~/media/files/research/heart-statistics/bhf-trends-in-coronary-heart-disease.pdf

5. Keys, A. et al., 'The diet and 15-year death rate in the Seven Countries Study', American Journal of Epidemiology, vol. 124, no. 6, December 1986; Available from https://academic.oup.com/aje/article-abstract/124/6/903/174332?redirected From=fulltext

6. 'Ancel Keys: Launching the Seven Countries Study', Netherlands, The Online Scientist [internet], March 2014; Available from https://www.sevencountriesstudy.com/about-the-study/investigators/ancel-keys/

7. Yudkin, J., 'Diet and coronary thrombosis hypothesis and fact', The Lancet, vol 271, no. 6987, 1957, p. 155–162.

8. Nordestgaard, B., 'Triglycerides and cardiovascular disease', The Lancet, vol 384, no. 9943, 2014, p. 626-635.

9. 'Sugar and your heart', London, UK, British Heart Foundation [internet] (accessed April 2019); Available from https://www.bhf.org.uk/informationsupport/support/healthy-living/healthy-eating/sugar

10. 'Healthy diet', Geneva, Switzerland, World Health Organisation [internet], 23/10/2018; Available from https://www.who.int/news-room/fact-sheets/detail/healthy-diet

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Set Task

Answer all activities in the spaces provided.

The activities in this task are based on the article.

Use the article and your knowledge and understanding of applied human biology principles, procedures and techniques to support your answers.

1 Discuss how the article uses scientific information to present the CVD crisis and its dietary causes.

In your answer, you should consider:

- how the article has interpreted and analysed scientific information to support the conclusions/judgements being made
- validity and reliability.

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2 Discuss the key factors affecting the CVD crisis and its dietary causes.

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(Total for Activity 2 = 16 marks)

3 Explain how different organisations/individuals influence the CVD crisis and its dietary causes.

In your answer you should consider:

- research
- health initiatives.

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(Total for Activity 3 = 10 marks)

4 Suggest potential areas for further development and/or research of the CVD crisis and its dietary causes.

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(Total for Activity 4 = 6 marks)

5 A recent news headline said:

Fat was framed: Sugar is the real criminal behind the CVD crisis

You have been asked to write an article for a health and lifestyle magazine about the importance of diet in reducing the risk of CVD.

When writing your article you must consider:

- who is likely to read your article
- what you would like the reader to learn from your article.

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(Total for Activity 5 = 16 marks)

TOTAL FOR PAPER = 60 MARKS

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